SIXTH ANNUAL REPORT ON FORESTRY OPERATIONS

OHIO
Agricultural Experiment Station

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BULLETIN 276

OHIO AGRICULTURAL EXPERIMENT STATION

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[3]In cooperation with Bureau of Plant Industry, U. S. Department of Agriculture.

BULLETIN

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REPORT OF THE FORESTER

EDMUND SECREST

At the close of the seventh fiscal year since the establishment by the legislature of a department of forestry at the Ohio Experiment Station, we are able to record with satisfaction a material advance in the forestry movement in Ohio. There has arisen a sentiment favorable to all lines of forestry work, the result in part, no doubt, of a nation-wide interest in the general conservation movement. Farmers are manifesting more and more interest in farm forestry. Institutions, both state and private, have come to realize that waste lands are better planted to trees than left idle and non-producing, and that their native forests are more productive when rightly managed. Municipalities are adopting forestry and forestry principles in the management of park properties. One large city has acquired land for the specific purpose of establishing a forest park. Colleges and universities have established courses of forestry in their curricula. A state law now requires forestry instruction as a branch of agriculture in the public schools. Everywhere there is being created a helpful sentiment in favor of this conservation movement.

During the past fiscal year, as heretofore, five lines of work have been continued, with the addition of several new phases.

Forest nurseries are established at five locations, the principal one being on the Experiment Station farm at Wooster. It is the policy of the Station to have on hand a variety of forestry stock to be used in the various phases of the experimental planting which is being carried on throughout the state. No great quantities of stock are grown, except of a few well tried species which have become popular with planters, though stock of other species is maintained for research work. No particular effort has been made to keep on

hands sufficient stock to supply the demands of forest planters in the state, but such surplus as remains is sold for forest planting at a nominal price. State institutions are supplied with trees free of cost. Others are charged at the approximate cost of production.

Most species of evergreen stock are purchased from large commercial nurseries in the form of two-year-old seedlings, and grown in transplant beds until of suitable size for transplanting. Some of the hardwoods are propagated from seed. The nursery facilities are not adequate to grow stock from seed on an extensive scale.

The policy of establishing state nurseries on a sufficiently extensive scale to supply the demands of forest planters has been adopted by a number of states. However, since forest planting has developed, a number of commercial nurseries have sprung up and are furnishing stock at reasonable prices. Particularly is this true in the case of seedling stock. Formerly, nurseries charged prices for transplanted stock that were prohibitive to forest planters. Moreover, certain desirable species were difficult to obtain. These conditions to a large extent, no doubt, were responsible for the establishment of many of the state nurseries in other states. Seedling evergreens are not sufficiently developed to be adequate for most Ohio conditions. For sod planting particularly, and on eroded and sterile lands where forest humus is lacking and the moisture content is minimized, they are not likely to thrive. Two-year-old pine seedlings are permissible for planting on recent cutover areas, or for underplanting and reenforcing, if sufficient humus and forest litter exist, provided the competition of grass and weeds is excluded. For most conditions of sod and old-field planting, four-year-old transplants are desirable. For reasons above stated it seems fair to those who have launched commercial forest nurseries, for the State to purchase seedlings as long as prices are reasonable, and to sell them to land owners at cost of production. Competition by the State in this wise would in no way jeopardize the legitimate business of nurserymen, but would serve to stimulate their sales. It would serve as a check in keeping prices within bounds, and would, in most respects, bring better results in the end. The State could exercise the prerogative of its experience and thus prevent mistakes in planting trees on unsuitable land, which might result where stock is obtained directly from commercial nurseries, whose management has no special interest aside from selling stock, or perhaps is not informed respecting local conditions. Furthermore, a centrally located nursery within the State would perhaps avoid long shipments and result in the distribution of fresher stock. The argument also

may be advanced that prospective planters would have more confidence and would be more likely to undertake operations in a venture which the state is encouraging.

Free Distribution of Stock. The experience of the Station does not encourage the gratis distribution of planting stock. At the outset for specific purposes it gave fairly good results. As a general rule, however, it may be said that the planter who is not sufficiently interested in his undertaking to pay a nominal price for planting stock is quite apt to be unsuccessful in the end. It is human nature to seize that which is offered gratis, oftentimes out of mere curiosity, and there is no doubt that trees are often planted by an individual for the simple reason that they cost nothing. He may have had no thought of forestry until his attention was called to the fact that his neighbor had received trees gratis from the State. Forest plantings fostered by this spirit (and there are examples) are quite likely to result disastrously. Neglect may allow them to remain as "object lessons" or the novice himself may grow tired and decide to grow corn on the field another year, and thus destroy his half-hearted efforts. Such practices are not general, to be sure, and to the large majority of the Station's earlier cooperators much credit is due for their sincerity of purpose and able cooperation, which has made so many of the forestry plantings productive of results. But the fact remains that the average planter prefers to pay for his stock.

Forestry Experiments. Since the inception of forestry work at the Station it has been the policy to keep the experimental side well in mind, operating on the assumption that an ultimate, well grounded state policy must be founded upon experimental knowledge of the work. Especially is this important where, in a State like Ohio, a variable and complex forestry condition prevails. Ohio conditions are unlike those of most other states, and we have much to learn from experience. Whenever opportunity presents, therefore, carefully planned experiments are instituted, on the assumption that experimental forestry should be years in advance of practical forestry, in order that, when the people seriously commence the practice of forestry, they may have object lessons and concrete examples from which to draw the desired information.

The Farm Woodlot. The woodlot in Ohio presents numerous and difficult problems. We cannot in many cases depend upon the culled remnants of our forests to reproduce the kinds of timber most desirable. We do not want woodlots to reproduce to ironwood, blue beech, black gum and other similar weed trees, and yet many of them may have an admixture of worthless and valuable

trees so distributed that "weeding" and reenforcing cannot be accomplished on account of the remaining trees overtopping the planted ones.

It is true that many woodlot operations are simple of solution. It is evident that a clear cutting with artificial planting should be made here, that a liberation or reproduction cutting should be practiced there, or a thinning made in another case. The point is that we are constantly encountering conditions where practices are questionable and where there is no previous experience to draw upon, nor concrete examples to follow.

Such conditions should not discourage the practice of forestry among private owners, but should stimulate action on the part of those charged with leadership in forestry, to determine what experimental lines are necessary, and then to attempt a practical solution, before a general policy is adopted. The policy of assisting private owners in the management of their native woodlots has therefore been given as much attention as possible. During the past fiscal year 54 applications for advice in woodlot management have been received. The interest of the farmer in forestry has gradually been diverted from unnecessary planting to the care of his woodlot. The average land owner is inclined to establish forest plantations on good agricultural lands, and not to consider the possibilities in his native woodlot. This practice is frequently the cause of loss on his part.

It is true that the recommendations for the management of woodlots are not always carried out at once, but such recommendations possess educational value, even to the owner who does not, or perhaps cannot follow the complete instructions of the Station, since he often follows certain fundamental principles which he has learned from the forester as excluding livestock, cutting out matured and weed trees, and exercising protection against fires. There are enough instances in which the forester's instructions are completely carried out to form excellent object lessons for future work in the community.

There are in Ohio approximately 4,600,000 acres of woodland, about 3,000,000 acres of which is apportioned among farms in the better agricultural districts of the State. These woodlots are held on comparatively high priced land, even though they may be on the poorest part of the farm.

Woodlot Pasturage. During the past few years the Station has taken a percentage inventory of the woodlot resources of the State. This survey extended over thirty counties representative of the agricultural districts. It was found that woodlot pasturage was the

basic factor affecting the timber asset; that while desultory cutting and clearing were also contributing factors, the grazing of livestock was responsible for the destruction of young trees and early death of the larger ones, and that a continuation of the practice will ultimately destroy the remaining woodland areas of the State. For the purposes of carrying on the study, the following classification was adopted: A. The unpastured woodlot containing sufficient young growth to insure perpetuation. B. Pastured, but containing young growth, and capable of reconstruction by the exclusion of livestock. C. Pastured to the extent that reconstruction is impracticable.

The results of the study may be summed up as follows: A. 16 percent, B. 33 percent, and C. 51 percent of the total land in forest. It can thus be seen that our real forest area is much lower than actually supposed, and that if the State is going to conserve the remaining remnants of a once unexcelled hardwood forest, something must be done to overcome or counteract the practices which threaten to leave us treeless and timberless.

The problem of woodlot pasturage in Ohio is a greater one than that of forest fires, since in the aggregate a larger portion of the forests are affected. Moreover, the higher land value in woodlot sections makes the loss proportionately greater, when pasturing is severe, than in the fire menaced portions where land values are low.

THE WOODLOT AN IMPORTANT ASSET

From the aspect of the individual and of the community the farm woodlot will contiue to be increasingly useful as an economic factor in the welfare of the State. The influence of timber tracts as windbreaks and modifiers of climate, is generally conceded. The farm woodlot is producing much of the timber of commerce. The territory within which woodlot forestry, as distinguished from timber growing, may be practiced, is steadily increasing. Density of population forces back further and further the forests in which exploiting lumbermen may be interested. Let it be emphasized that the aggregate output of the woodlots of the United States is now an important factor in the timber market, and it is increasing. It can be marvelously increased if we do not despise it. In Ohio, good soil, good climate, and a sufficient remainder of the old stand makes it possible to establish good commercial forests anywhere—*providing woodlot grazing is stopped.*

WOODLOT PASTURES NOT PROFITABLE

There are many thousands of acres of so-called forest land in the State held at a loss by the owners, for the reason that it pays neither as forest nor grazing land. It is common knowledge that

woodland pasture is inferior to that of the open in both quantity and quality. On the other hand, nothing can be expected from the woodland pasture in the way of forest. It is a negative proposition from every aspect.

WHAT THE FARMER CAN DO

It can thus be seen that for the farmer himself the woodlot is an economic problem. It involves the business side of his farm. It must be taken into account if the farm is to attain its greatest productive capacity. It may be said without reservation that the average woodlot is one of the common "leaks" on the farm.

The management of woodlots in most cases involves technical knowledge and experience. It is generally not advisable for a farmer to attempt a solution of his woodlot problems and follow out a self laid plan. Mistakes in this wise are apt to result disastrously and nature does not grow trees in a season. It is always wise to secure the services of a competent forester at the outset, and thus have the benefit of his experience in determining the policy to be followed.

It is often more profitable to start with the remnants of a woodlot as a nucleus, battered and culled though it may be from the effects of abuse, than to attempt planting on tillable land. The point to consider in the native woodlot is the stock on hand, and whether or not the area can be perpetuated by natural seeding. The woodlots over a great portion of Ohio contain species easily reproduced by natural seeding, under favorable conditions. Matured trees can be removed and marketed, weed trees, dead and crooked or distorted individuals removed, all for the benefit of the smaller growing ones. Such procedure is not only directly profitable to the land owner by virtue of the marketing of mature and decaying timber, but his woodlot becomes a potential producing area. The practice of woodlot forestry brings immediate financial results as contrasted with the establishment of pure artificial forest plantations.

The woodlot owner, however, must first make up his mind that the combined woodlot and pasture shall be abolished. Timber must be recognized as a crop, the same as corn or wheat, and the farmer would never think of turning his livestock into a corn or wheatfield. If fire is the chief menace to the far western forests, then grazing is the most destructive factor to Ohio woodlots. A practical solution of the woodlot and pasture problem seems possible by fencing off the best timbered portion of the woodlot and reserving it from livestock, and clearing and devoting the other portion to pasture. Such procedure will bring good results in many woodlots of Ohio, and will undoubtedly be more profitable to the owners.

WHAT THE STATE CAN DO FOR THE WOODLOT OWNER

The first function of the Experiment Station is to induce private owners to practice forestry. There are plenty of arguments for state forests, but the difficulty is to get the forests. Since the State owns no woodland, private owners and not the State must practice forestry until land is acquired.

The Station offers assistance to any land owner who wishes to improve the condition of his woodlot. A forester is sent to make an examination of his tract, and report to him the best methods of procedure. This work is in most cases done without cost to the owner, especially for the preliminary examination. Trees are furnished at cost if planting is necessary. Aside from these features no other encouragement is authorized by the State.

MUNICIPAL FORESTRY

Municipal forestry has come to be recognized in Ohio. Three cities are now interested in the movement. Cincinnati is developing an area which in a few years will approximate 2,000 acres. Cleveland and Oberlin have also taken an active interest. There are many arguments in favor of municipal forestry. They are fully set forth in the Fifth Annual Report of this Station on Forestry in Ohio.*

Experience has shown that for his limited opportunities, the city dweller is more keenly interested in forests and forestry than his rural brother. He is more eager to support financially a project involving the conservation and perpetuation of woodlands. Proportionately the number of applications for woodlot examinations received from urban owners of farms is much in excess of that from the rural dweller. Whether the desire is founded upon sentiment, landscape effects, or utility, the result is the same so far as the practice of forestry is concerned. In the city the spirit of conservation and perpetuation in relation to forests prevails everywhere among intelligent people. A spirit based upon sentiment admittedly, but the very foundation required for the practice of forestry. The concentrated wealth of the urban population is a further argument in favor of the establishment of municipal forests. They are both able to make the necessary outlay and to bear the burden through the period of years necessary for returns from the investment. Thus with a disposition to support forestry, both financially and morally, it seems a matter important and profitable enough to be seriously considered by cities.

*Ohio Experiment Station, Bulletin 254.

Cincinnati has taken the lead among the cities of Ohio in respect to this movement. It is perhaps the most important undertaking of its kind in the United States. Under an efficient board of park commissioners, the work of construction is moving rapidly. The areas secured are being extended as rapidly as private owners can be bought out. During the spring and fall of 1913—the first year of active operations—over 230,000 trees were planted permanently. A nursery was established containing some 250,000 seedlings for future use. Including sizable transplants in the nursery and orders placed elsewhere, over 500,000 trees will be placed permanently in the fall of 1913 and spring of 1914. The capacity of the nurseries will be doubled. This work is being done under the direction of the Experiment Station.

The Oberlin municipal farm of 100 acres is now practically reforested. It is a combination of artificial planting and natural regeneration, and is the best object lesson in Northern Ohio. The native woodlot of about 20 acres has been under management since 1906. It was at one time heavily pastured with little prospect for ultimate perpetuation. By the exclusion of livestock, and a selection cutting of some of the larger trees, an excellent reproduction of white ash, shellbark hickory, red oak and sugar maple has been secured. The tract is an excellent demonstration of successful natural regeneration after a reproduction cutting in a typical north Ohio woodlot, where the species lend themselves to this method of silvicultural treatment to best advantage.

FORESTRY AT STATE AND PRIVATE INSTITUTIONS

Kenyon College: The planting at this college, located at Gambier, was continued in the spring of 1913. 300 pines, 900 chestnuts, and 2100 red oaks were planted on a certain area, where a mature stand of black and white oaks was removed. Previous plantings, covering a period of four years, are giving good results, particularly the white and red pine plantations. The work at this institution will be continued as heretofore.

Ohio State Sanatorium: 3,000 red and white pines were planted in the spring of 1913, with minor loss, notwithstanding the dry season following. It is the plan of the Station to establish pine plantations of considerable area at this institution. Active operations have been commenced in the 125-acre, virgin woodlot. 20,000 feet of inferior black and scarlet oak has been marked for removal. The operation will involve a clear cutting covering about 4 acres. The area will be replanted to white pine. The woodlot will be

reconstructed by the patch method, which will necessitate the cutting of worthless or matured groups of trees and subsequent artificial restocking.

DRAINAGE BASIN STUDIES

The terrible and unprecedented devastation wrought by the March floods of 1913, general throughout Ohio, has again brought forth comments on the relation between the catastrophe and the deforestation of the drainage basins of the State. A medley of opinions is advanced, ranging from flat denial that there is any relation between forests and forest cover, and the run off of water, to the statement that forests would have prevented the floods. These two absolutely adverse opinions are based in part upon the extreme views of a group of observers, whose official connections give their statements weight, and partly on the utterances of partisans whose ill considered claims do the cause of forestry more harm than good.

The seriousness of the situation and the efforts on the part of the state and federal governments to arrive at a definite conclusion as to cause and remedy have led the Station to undertake an investigation of the drainage basins of the larger streams of the state in an effort to determine what the forest conditions are, and if possible what practicable means might be undertaken, so far as forestry is concerned, to assist in the work of rehabilitation. During the summer of 1913 surveys of the following streams were made: Mohican, Walhonding, Tuscarawas, Muskingum, Little Muskingum, Scioto, Little Miami, and Hocking Rivers and Brush and Duck Creeks, including some of the larger tributaries. These streams are for the most part representative of Ohio rivers, and conditions existing upon their respective drainage areas may be said to apply to those of other streams of the state, with the exception perhaps of those flowing through the level stretches of North-western Ohio, which have no well defined valleys and where forestry could not well be considered a contributing factor in plans for rehabilitation. The results of this survey will be issued in a special report.

COMMERCIAL TREE STUDIES

The several species of oak are commercially the most important of Ohio forest trees. The oak forests constitute by far the greater percent of lumber producing trees of Southeastern Ohio, and they will in all probability continue to lead in this respect. On the coal and furnace tracts of some of the river counties the oak forests constitute the greatest surface asset. The soils and topographical features of the areas are not adapted to tillage, but the

vigin growth has been removed and converted into charcoal for use in the reduction of iron ore. In some cases even the second and third growth has been thus utilized. In consequence there are many thousands of acres of even-aged stands of all ages, consisting chiefly of white, black and chestnut oaks. Excepting in cases of fire injury these stands have been well preserved, and the oldest (approximately 60 years) are ready to be recut for lumber. There is little attempt at conservative management on the part of the owners. Misutilization is quite common and systematic cutting and thinning are rarely attempted. During the present season the Station has a party in the field constructing volume and yield tables and studying conditions on these tracts. It is intended to issue a separate report on this study.

EDUCATIONAL

It is the policy of the Station to disseminate forestry information through every means possible, believing that a properly created sentiment in favor of forestry will do much to bring about improved practices. It is gratifying to note the number of agencies now contributing to the educational feature of the work. The Ohio State University is doing good work in its course of instruction for the benefit of its forestry and agricultural students. Other colleges and educational institutions have added forestry to their curricula, and much good will be accomplished even though the work be elementary and abbreviated.

FORESTRY IN THE PUBLIC SCHOOLS

Agricultural education is now compulsory in the public schools of Ohio, and forestry is taught as one of its branches. The effect of such istruction upon the young is bound to exert a most favorable influence upon the coming generation. Sentiment is a powerful factor in the development of any line of effort, and sentiment in favor of forestry will give it needed moral support, now not well enough established in America. In the most progressive countries of Europe, where the practice of forestry is highly developed, the government policies in this respect are accepted without question as to their value. The desire to conserve and care for trees is instinctive in every boy and girl. It has been handed down by their forefathers. The Teuton is by nature a conserver—until he comes to America. The American people by instinct and practice are—as are all developers of new countries—a nation of tree destroyers. With the great change in economic conditions the practice and instinct still remain. As long as the instinct smoulders in the breast of the American boy the practice will continue, until the field for

destruction is exhausted. Furthermore, policies of construction and rehabilitation will not meet with support until this attitude is overcome. It seems therefore that the policy pursued with reference to forestry instruction in public schools is wise and timely. The future generation, more than the present, will feel the effects of the exhaustion of the natural resources, and when people are by necessity compelled to practice forestry, they will have the foundation upon which to build—a well enlightened and sympathetic public sentiment. It is therefore the province of public school instructors to instill into the boys and girls of our state a love for trees and forests, and a sympathetic attitude toward efforts to develop policies of reconstruction and rehabilitation.

The Station is assisting schools by the establishment of concrete examples. It has offered to distribute trees to schools possessing sufficient ground where they can be developed for final transplanting. It is intended to use the smallest seedlings practicable and have the pupils carry on the operations necessary to bring them to the proper size for transplanting on the grounds of the school. They can thus learn the habits and values of the different species and how to plant and care for them. It is needless to say that this policy will bring results if carefully supervised by the instructor.

COUNTY FAIR EXHIBITS

During the past year forestry exhibits were made in connection with the regular Station exhibit at 28 county fairs and at the state fair at Columbus. The purpose was to illustrate the principles and practice of forestry. One of the features that excited most interest was a minature model constructed to illustrate the effects of erosion and the run-off of water on forested and deforested watersheds. The principle of the relation between the forest cover and the run-off of water was well illustrated. Water was made to fall by means of sprinklers and connection upon two mounds of earth, made to represent hills. One mound was covered with moss to represent the forest cover, and small evergreen twigs for trees. The other mound was left bare. Conduits made to represent winding streams, led the water from the mounds into two lakes. It was indeed interesting to note the clear water coming from the "forested hill" in comparison with that which flowed from the "deforested slope" carrying with it soil and rock, filling the channel of the "stream," spreading over the "valley" and finally filling the "lake." The entire model was constructed upon a concrete base and is not difficult to build. Schools and other institutions would find it an interesting and valuable asset in connection with their forestry instruction.

The Station has continued the policy of giving lectures on forestry before farmers institutes, picnics, granges, students of forestry, teachers, civic clubs, chambers of commerce, or whenever forestry addresses are desired. During the past year 15 addresses of this nature were given. Every year a printed available list of forestry subjects for discussion may be had on application to the Station. No charge is made, excepting the actual traveling expenses of the speaker. Subjects will be illustrated upon request.

WOOD UTILIZATION

Both wood production and wood utilization are necessary factors in forestry. The latter feature unfortunately is not well developed in Ohio. A study of the wood using industries of the State, made in cooperation with the U. S. Forest Service, has been completed. This report is available for woodlot owners and wood-users. It will bring the producers and consumers of wood in closer touch with each other. It shows the kinds and amounts of wood used within the state, and where markets may be found for them.

FOREST PLANTING WITHIN THE STATE

This feature has interested more land owners than any other phase of forestry. It was stimulated at the outset by a desire to supply the farm with posts and poles and, in many cases, windbreaks.

Forest planting will play an important role in Ohio forestry, although it must take second place in importance. By virtue of the large aggregate area of native forests, the management of the woodlot must come first. There is ample reason for this argument. While much of the work in the woodlots of the State calls for clear cutting and subsequent planting there are still greater areas of forest to be managed through systems of proper cutting and natural reproduction. The Experiment Station will provide land owners with trees at cost, in so far as the supply on hand permits. Several commercial nurseries have been established recently and are growing a considerable variety of forest trees.

The Station will assist prospective forest planters, by making examinations of proposed planting sites and reporting to the owner the trees best adapted to conditions and the best methods of planting and management. There is no charge for this service, excepting subsistance for the forester while the examination is being made and transportation from the nearest R. R. Station to the tract examined and back.

LEGISLATION

There are several features relative to forestry that should engage the attention of our legislators. Numerous suggestions have been made from time to time, some of which have received the consideration of the legislature, but which do not offer a solution of the problems involved. Occasionally the spirit of the proposed legislation is good but the usual difficulty is that it is often too specific to be workable.

It is one thing to give a forestry bureau or department the right under general regulations to decide how many trees a man shall plant per acre in order that he may have his woodlot exempted from taxation, and quite another thing to prescribe by legislation the exact number that shall be planted. Nowhere, in countries where well developed forest policies exist, are minor restrictions imposed on the owners of forest lands or forestry practices. All rules are laid down by experienced foresters to suit individual cases.

FOREST TAXATION

A discussion as to the advisability of a change in the methods of forest taxation may be found in the last annual report (Bul. 254.) There can be little doubt but that the 4,600,000 acres of woodland in Ohio would benefit largely, were better systems of taxation in operation. The testimony of many land owners is to the effect that they cannot afford to maintain woodlots on their lands under present conditions. There is a disposition among them to feel that the state should offer encouragement by at least lowering the assessment. One large timber owner in southeastern Ohio states that he is assessed at the rate of $26 per acre for land from which he is receiving no income at the present time, and which he would be glad to sell for $15 per acre. He also states that if offered some encouragement in the way of reasonable taxation he would be glad to take up the practice of forestry. This case is only one of many and is a concrete example of the inequality of the general property tax. There are also those who are grossly under assessed, but such cases only confirm the unsoundness of the present policy.

A number of states have taken up this problem. Some have appointed commissions to inquire into conditions and to determine what changes if any should be make. There is a unanimous agreement that our present property tax should not apply to forests, and with some variation their remedies are harmonious.

The proposed Wisconsin law, modified to meet conditions, seems applicable to Ohio. It provides for two classes of forests

which may be separately classified for taxation, the first class comprising farm woodlots which may be exempted from taxation under regulations to be prescribed by the forestry department of the State, while the second class includes large forest areas held for investment or speculative purposes.